(No Model.)

A. B. CALKINS.

STEAM ENGINE INDICATOR.

No. 427,044. Patented May 6, 1890.

Fig. 1.

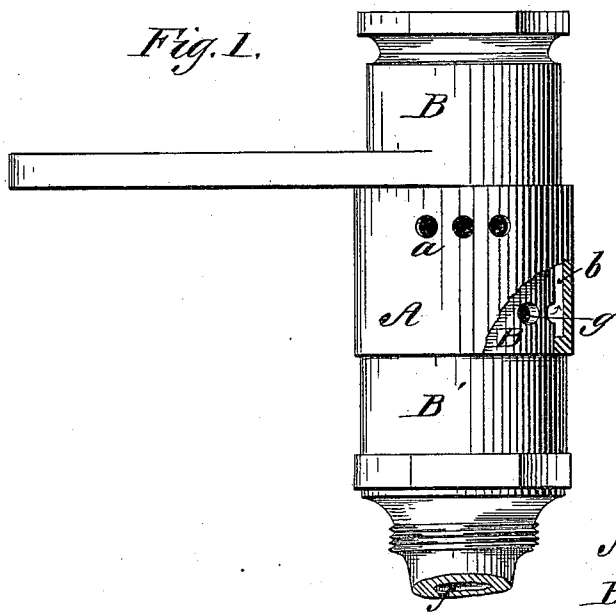


Fig. 5.

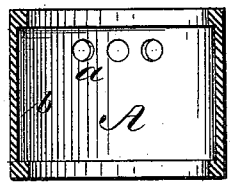


Fig. 3.

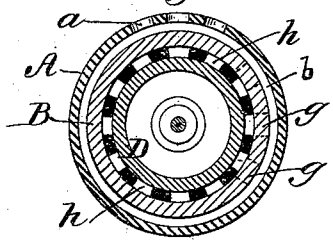


Fig. 2.

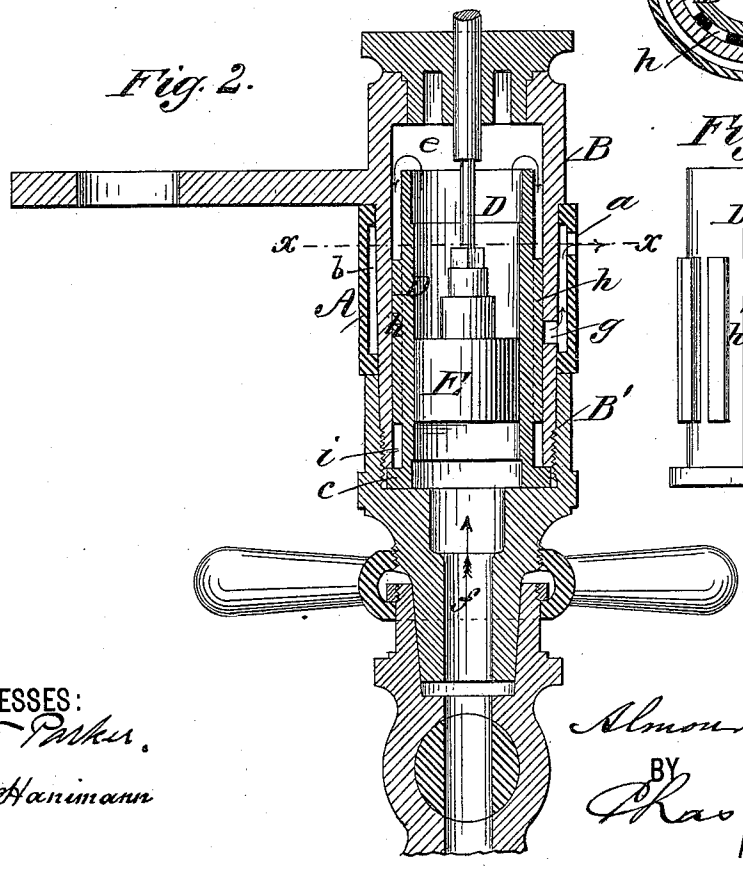
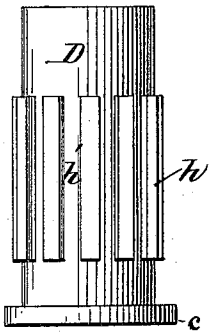


Fig. 4



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ALMON B. CALKINS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE ASHCROFT MANUFACTURING COMPANY, OF SAME PLACE.

STEAM-ENGINE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 427,044, dated May 6, 1890.

Application filed August 5, 1889. Serial No. 319,812. (No model.)

To all whom it may concern:

Be it known that I, ALMON B. CALKINS, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Steam-Engine Indicators, of which the following is a specification.

My invention relates to indicators for recording by means of a diagram the successive pressures in a steam-cylinder during the performance of the strokes of the piston, and an essential to the free operation of such instrument is that the indicator-piston shall move freely in its cylinder, incurring a considerable leakage of steam.

The object of my invention is to make a convenient disposal of the current of steam issuing from the indicator-cylinder by reason of such leakage; and another object is to reduce the temperature of the escaping steam, thereby lessening the force of the current; and in order to enable others skilled in the art to which my invention appertains to understand and use the same, I will proceed to describe its construction in detail, referring to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of the cylinder of an indicator, the diagram or card drum and other parts being removed; Fig. 2, a sectional elevation of Fig. 1; Fig. 3, a horizontal section on the line x x of Fig. 2; Fig. 4, a side elevation of the interior cylinder of the indicator, and Fig. 5 a sectional detail view of the external ring.

Similar reference-letters indicate corresponding parts throughout.

In the types of indicators heretofore used the outlet-holes have been located in a stationary part of the instrument or in a part that must be released by means of screws or otherwise, in order to change the position of the holes, a manipulation which is inconvenient, especially when there is a limited space to operate in.

My invention consists, essentially, of a rotary ring A, fitted to the exterior of the indicator-cylinder case B, into the interior b of which ring the escaping steam is admitted and is directed through the outlets a in any desired direction by simply turning the ring A.

The cylinder-case B is supported in the lower case B′, being screwed therein, and beneath its margins the shoulder c of the cylinder proper D is clamped, holding all the stationary parts in proper relative position.

The indicator-piston E is fitted loosely in the cylinder D, and the exterior of the latter is smaller than the interior of the cylindric case B, and is provided with longitudinal ribs h to fit the case, leaving grooves h' between them for the free downward passage of the escaping steam from the chamber e above the piston.

g g are outlets establishing communication between the escape-grooves h' and the interior of the ring A, so that such grooves as lie opposite the holes g may educt the steam from the chamber i below the termination of the ribs h or directly from the chamber e in part.

The ring A is composed of thin metal, and is retained endwise between the shoulder of the case B B′ thereon, so as to revolve freely to any point of adjustment.

In operation, the steam entering the pipe f in the direction of the arrow operates against the bottom of the piston E. The proportion of steam that escapes around the piston into the chamber e passes through the grooves h', outlets g, chamber b of the ring, and outlets a with sufficient freedom to prevent back-pressure in the chamber e.

The ring A being very thin and susceptible to the temperature of the atmosphere, is very much cooler than the interior chamber at e, and in consequence acts as a condensing agent upon the outgoing steam, thereby reducing its temperature, pressure, and velocity.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the piston-cylinder of a steam-engine indicator, of a rotary adjustable exhaust-ring surrounding the same, having outlets in its periphery that communicate interiorly with the exhausted side of the indicator-piston, for the purposes set forth.

2. The combination, with the piston-cylinder of a steam-engine indicator, of a rotary adjustable ex aust-ring surrounding the cylinder, a circumferential condensing-chamber

within the ring communicating with the exhausted side of the indicator-piston, and outlets to said chamber located upon one side of the periphery of the ring.

3. In a steam-engine indicator, the combination of a piston-cylinder, bearing longitudinal ribs on its exterior extending a part of its length, a concentric cylinder-case within which said cylinder-ribs fit to form channels, outlets in the cylindric case opposite a part of the members of said channels, and a chambered rotary ring surrounding said outlets bearing the final outlets in adjustable positions, substantially as described.

ALMON B. CALKINS.

Witnesses:
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